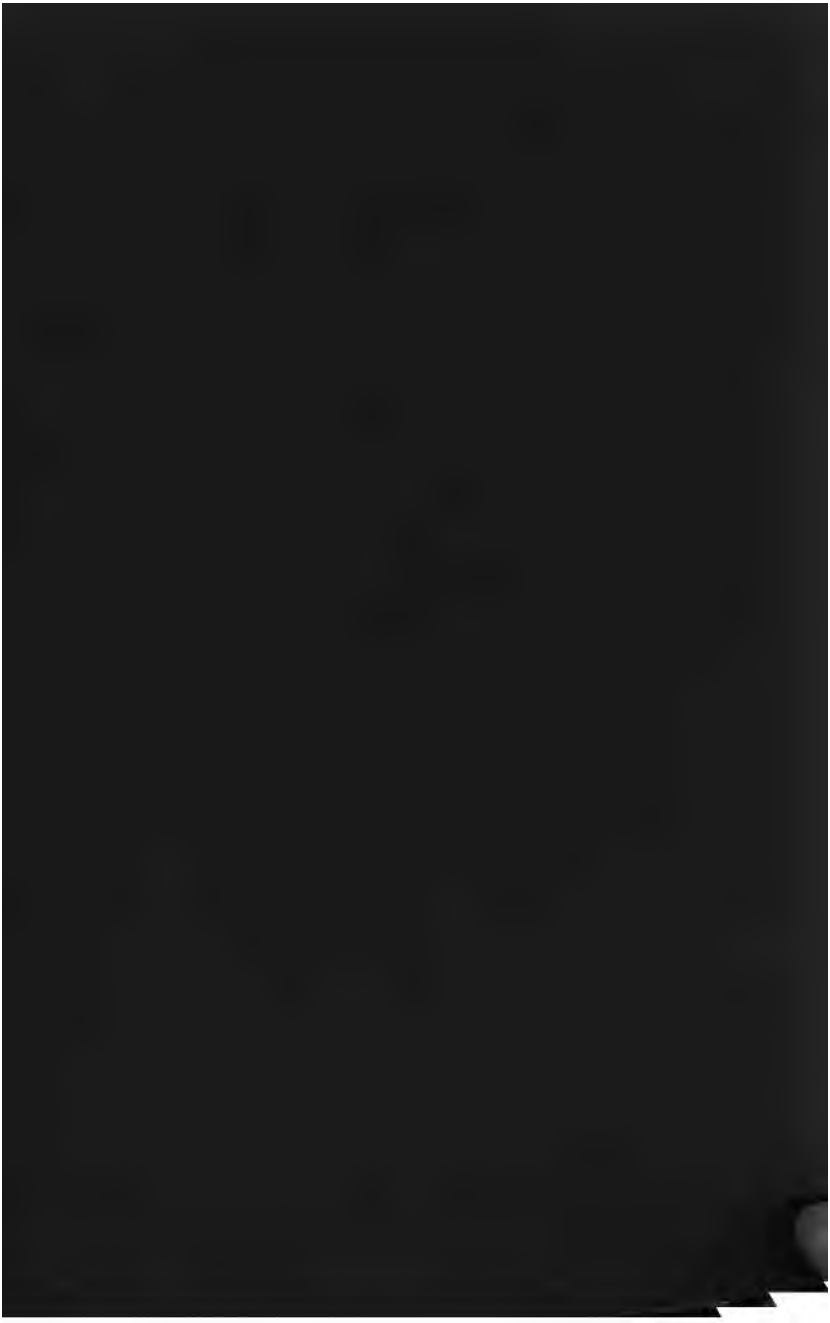
SCIENCE & HUMANITY



SCIENCE AND HUMANITY;

OR,

A PLEA FOR THE

Superiority of Spirit over Matter.

BY

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PREFACE.

PORTIONS of the following essay were delivered as an address before the Societies of the *Φ. B. K.*, in Harvard and Trinity Colleges, in June and July last. The request for its publication has been made by many persons, and in form by a committee of the Society in Trinity College. The author preferred to publish the whole as a philosophical essay, with some additional paragraphs and notes. No explanation is required in respect to the in-

terest and the importance of the subject—especially at the present time—in this country and in Great Britain.

N. P.

Yale College, Dec., 1871

SCIENCE AND HUMANITY.

NOT many days ago, as I strayed into the study of an eminent physicist, I observed hanging against the wall, framed like a choice engraving, several dingy, ribbon-like strips of, I knew not what, arranged in parallel rows. My curiosity was at once aroused. What were they? and why were they so carefully protected and so greatly honored by my realistic friend? They might be shreds of mummy-wraps or bits of friable bark-cloth from the Pacific, and there-

fore needing to be guarded under glass; or perhaps, indeed, they were remnants from a grandmother's wedding dress; or shoe-ties, out of which all color had faded, leaving a faint shimmer of satin finish on the water-stained surface. They were none of these; to have suggested any of which might have been resented by the grave philosopher, who solidly explained that they were carefully-prepared photographs of portions of the Solar Spectrum.

I stood and mused, absorbed in the varying yet significant intensities of light and shade, bordered by mystic letters and symbolic numbers. As I mused, the pale legend began to glow with life. Every line became luminous with meaning. Every shadow was suffused with light shining from behind, suggesting some mighty

achievement of knowledge; of knowledge growing more daring in proportion to the remoteness of the object known; of knowledge becoming more positive in its answers, as the questions which were asked seemed unanswerable. No Runic legend, no Babylonish arrow-head, no Egyptian hieroglyph, no Moabite stone, could present a history like this, or suggest thoughts of such weighty import, or so stimulate and exalt the imagination.

Over against these symbolic bands—records of light by means of the light and glowing with light to the soul—hung the portrait of Newton, with its wondrous forehead and eagle glance. I turned from the spectrum to the portrait and from the portrait to the spectrum, still musing as I turned. Newton's daring

suggestion,* that the force, familiarly recognized on the earth, might prevail as far as the moon and possibly extend to the sun—coming like inspiration, but held in abeyance for years, till careful and long-delayed measurements made it spring into an acknowledged fact, this came to mind as it had never done before. With it the successive experiments of Newton upon the light—his expansion of the colourless beam into the gay and many-coloured spectrum, suggesting theories of rays and undulations and

* "As he sat alone in a garden, [1666,] he fell into a speculation on the power of gravity; that as this power is not found sensibly diminished at the remotest distance from the centre of the earth to which we can rise, neither at the tops of the loftiest buildings, nor even on the summits of the highest mountains, it appeared to him reasonable to conclude that this power must extend much further than was usually thought: why not as high as the moon? said he to himself; and if so, her motion must be influenced by it; perhaps she is retained in her orbit thereby."—WHEWELL, *Hist. of the Ind. Sciences*, vol. 1, b. vii., ch. ii., § 3."

mystic powers in the several colours. There followed the thought of Wollaston and Young and of Fraunhofer, and his discovery of the lines that were afterwards to be interpreted as a language from far-off worlds. But, first, chemistry must come into being, to evolve the gases and decompose the solids, that it might use the refracted light to determine the elements of that which is consumed in the light-giving flame. Each one of these steps of progress involved bold invention and exact observation. But each was necessary to this proudest achievement of our times, by which the scientist has connected the sun and the earth by the closest affinities, and interpreted the structure of the orb which for centuries had smitten with blindness the eye that had ventured to gaze

familiarly upon its face, and has even resolved the nebulæ themselves into luminous gases.

I exclaimed in thought: "Would that Newton were now living, and could look with our open vision upon the blinding sun, the glowing stars and the burning nebulæ!—those objects which science first made so remote and now brings so near—between which and the eye she first interposed such abysms of distance as appal the imagination, and at last made so familiar and so near, that we inspect the sodium or the hydrogen that burns in the lamp upon our table, with the same look with which we watch the sodium and the hydrogen that have been consuming for ages in the sun, or the stars. Of all the kings and prophets of science, surely Newton would most have desired to see the

things which we see and to hear the things which we hear. Would, indeed, that he could live again and witness the completion of the work which he so nobly began!"

I awake from my musing, and, abjuring any scepticism which I may have cherished, I confess my faith in modern science. Though hard-hearted as any metaphysician ought to be, I prostrate myself before her shrine—nay, so ardent is my neophytic zeal, that I am tempted to glorify the photographic spectrum into a fetich. Indeed, had I nothing else to reverence, I could easily worship this.

I returned to my studies a wiser, perhaps a sadder man. To refresh and assure my bewildered spirit I think of Socrates. Turning to the Memorabilia of Xenophon, I find I was

not mistaken in my memory, for it is there set down to the credit of the philosopher, that "he never discoursed concerning the nature of all things, how that which the Sophists call the universe, ὁ κοσμός is constituted, under what laws the heavenly bodies exist, etc., but invariably represented those who concerned themselves with inquiries of this sort as playing the fool. First of all he inquired whether such persons thought they had so far mastered the facts which relate to man as to be justified in proceeding to such investigations, or whether they considered it in order to leave human inquiries for physical researches."* Thus records Xenophon concerning Socrates. Poor deluded son of Sophroniscus! For such sentiments,

* *Xen. Mem.*, Lib. I. Cap. I. 11–16.

the present times would be more against thee than were thine own, hard as they were! Even the defence of atheism would not have saved thee against so enormous a heresy respecting the sciences of nature. Had a society of modern scientists sat in judgment upon thee, they for once would have been unanimous and voted thee worthy of death. Certainly thou wouldst have had a smaller minority than thou hadst in ancient Athens, in any modern scientific association, whether it were a society for mutual admiration or for reciprocal altercation. For is it not now an exploded idea that man, or what concerns him, is better worth regarding, than what was called nature by the sophists in the time of Socrates? Is not man himself now in danger of being eliminated out

of the kosmos? And as to holding that man has any great significance in the universe, has not the doctrine become fixed that science has to do only with phenomena, *i. e.*, with material phenomena and their relations? Has not man been satisfactorily resolved into nerve-substance and vibrating force, and thus brought under the laws of mechanism? And has it not come to unconscious speech without even the suggestion of unconscious irony, that this is the only way in which man can be scientifically studied, even though by this process he is scientifically disposed of? Is it not now near being demonstrated, that man, as body and spirit, as conscience and speech, has been evolved from lower forms of being, with all his furnishings of aspirations, categories and

principles; and is it not also a matter of grave question, whether he can long remain in his present transition state—whether, having been evolved from some very indeterminate germ, he may not be evolved into something altogether impalpable? In short, is not man ranked very low in the present estimates of comparative science, and is he not in danger of being very soon left out of them altogether?

Somewhat after this fashion ran our meditations respecting nature and man; according to which the two are brought into sharp antagonism as objects of certain and trustworthy knowledge, and as claiming attention from the modern philosopher and educator. Already in the departments of study and of education, an active controversy has

sprung up which threatens to bring on a sharp litigation, in which the parties are to be the Sciences of Nature and the Science of Man. At present the odds are largely against man, and we fear that soon it may be claimed that man has no rights which the student of nature is bound to respect; that if science requires it, man must go to the wall. There is no telling how soon he may be summoned to allow himself quietly to be shoved out of being under the operation of natural selection, or to be sublimated into some sort of impalpable incense upon the altar of scientific progress.

Under these unequal odds I bring to this ancient and honorable Philosophical So-

ciety *—a society which originated when philosophy had another meaning than is claimed for it at present—a plea for the science of man; not as against the sciences of nature, to whose claims I have already confessed my allegiance, but as essential to these sciences, and as, therefore, incapable of being ever superseded, or set aside, or left behind in their most splendid achievements. I would even be so audacious as to seek to show that in all these man must be a constant quantity, and that the elements which he furnishes can never be dispensed with; that, as the sciences of nature make progress, these elements will come more and more distinctly into recognition; that as Nature is more profoundly

* Of the Φ. *B. K.* of Harvard and Trinity.

studied, the results of this study will bring Man's capacities and endowments more distinctly into view. I would demonstrate that man must be thoroughly understood, and nobly confided in, if nature is to be interpreted in its widest relations, and our confidence in the principles and laws, which are essential to the science of nature, is to be surely established. I offer this plea not in the interests of strife, but in the interests of peace; not to gain a one-sided victory, but to show that no action can hold between the two parties, because the sciences of nature and of man can never be at variance. I would also show that as there can be no science of nature which does not recognize the science of man, and as the study of nature cannot be prosecuted to

the neglect of man, so the study of man will be always furthered by a generous study of nature; that as on the broader field of investigation and culture, so on the narrower field of education and discipline, the scientific study of nature and the scientific study of man are mutually dependent and mutually helpful.

We enforce our argument first of all by an *analysis of the conception of science.* What science is, is not so easily stated as would seem likely from the freedom with which the term is used, or the readiness, not to say the flippancy, with which its authority is enforced. The most cautious scientist would doubtless concede that *nature* furnishes the materials and *man* arranges them; more exactly, the ob-

serving man *collects* facts, and the reflecting man *explains* facts. We speak freely of the careless glance of the one and the sagacious insight of the other. We talk of the *secrets* which nature has been carefully hiding for generations, and has been reluctantly forced to yield at the bidding of one who had overheard the charmed words at which the doors of her treasure-house must fly open. If we are sufficiently curious to ask what science is, every answer which we give must carry us back to man as an agent who thinks natural facts into scientific theories, who explains phenomena by laws, and founds systems on principles. This question, it is true, may be curious rather than useful. It were too much to expect that Newton should pause in the

tremulous suggestion that first connected the detention of the revolving moon with the force that brings down the falling stone, in order to ask whence the suggestion was inspired and how it could be justified; or that the ardent Davy should have held back from the brave experiment that literally unearthed the bounding potassium, in order to perfect a metaphysical analysis of the processes which discovered, or the reasons which foretold it,* or that Kirchhoff should have been diverted

* For the details of this discovery and experiment, see Life of Sir Humphrey Davy, Chap. III. We quote the following; "I have been told by Mr. Edmund Davy, his relative and then assistant . . that when he [Sir Humphrey] saw the minute globules of potassium burst through the crust of potash, and take fire as they entered the atmosphere, he could not contain his joy—he actually bounded about the room in ecstatic delight; and that some little time was required for him to compose himself sufficiently to continue the experiments."

from the daring gaze by which he would read the secret of the sun in order to interpret the thoughts which emboldened him to the effort. But how is it after a discovery has been made, or a great secret of nature has been mastered? Then not only curiosity turns from the result to the process by which it has been achieved; but the anxiety to make sure that the jewel wrested from nature has been lawfully obtained and may be safely held, impels to the earnest inquiry whether the charm by which we won it was whispered us in our ear by the honest spirit of nature, or by some mischief-loving imp of the mocking phantasy. So it happens that long after Newton's discovery has become a common-place to the school-boy, and Davy's experiment

is repeated every day by the shop-lad, and the revelations of the spectrum-analysis have enabled the novice glibly to discourse of the secrets of the sun, that then the true and earnest philosopher carefully retraces the path which has conducted science to the dizzy heights on which she stands, and tremblingly inquires, How came I hither? Is the standing ground firm? Are the objects which I seem to see the firm and solid land, or only a delusive mirage?

Now, if we ask these questions, we must answer them; and if we answer them, as we contend, we must study the nature of man. We cannot justify the processes by which we interpret nature, unless we scrutinize the processes of the human spirit which performs

them, and search after the principles and faiths which these processes assume and rest upon. We cannot discover and vindicate the grounds on which our inquiries rest, without finding them imbedded in man's being as axioms and principles which, as the result of further scrutiny, we find that he can neither question nor set aside. The foundations of the science of nature in the last analysis are discovered in the ineradicable beliefs and convictions of the human spirit, and it is only by the earnest and careful study of this spirit that we can find them, and, having found them, can recognize them as the principles by which we interpret both nature and man.

Were we to proceed further in the analysis of science, we should add that science

objectively viewed is universally conceived as *related knowledge.* Those who limit it most narrowly, assert that it gives us phenomena connected by relations. But facts or phenomena do not connect themselves. To conceive that they do or can, were to fall into the worst and emptiest trick of personifying an abstraction, against which this class of philosophers are the most earnest in their cautions. They require an agent to do this work, and to do it, not after the caprices of an infant's or an idiot's handling, but by wise and intelligent combinations. Whence do these relations—these mystic bonds of science—proceed? The interpreting mind does, in some sense, find them already in its hands. Whether they are evolved from its own experience,

as the progressive acquisitions of association, that cannot be broken, as Mill, Bain, and Spencer would teach us; whether like a mystic veil, they are thrown over the otherwise chaotic phenomena of both matter and spirit by the formative energy of man, as Kant confidently suggests; or whether they are at once the conditions of thought to man, because they are conditions of being in nature and God, as the wit of common sense and the research of the profoundest philosophy declare, these relations must, in the study of nature, be confidingly applied by man as fast and as far as the chaos which bewilders the infant and overaws the savage, is thought into a cosmos by man's interpreting reason. If the inductive sciences claim allegiance from the

common sense of mankind, the inductive method must be justified to its most critical, and even its sceptical analysis. But the inductive method can in no way be justified, except as the intellect falls back upon its own underlying faiths concerning God and nature. Briefly, *an inductive science of nature presupposes a science of induction, and a science of induction presupposes a science of man.*

We urge still further that the *history of the sciences of nature* illustrates their near relation to the science of man. Before Socrates, the physics were as crude as the metaphysics. Both alike were raw guess-work, founded on hasty resemblances more rudely interpreted and generalized. From such speculations about matter and spirit

Socrates wisely withdrew his thoughts, that he might first understand himself as nearer and more intelligible to himself than nature. But in learning how to study himself, he also learned the secret of knowing other things. If we may trust the brief expositions of Xenophon, and the embellished dialogues of Plato, he learned the rules of cautious observation, wise definition, and comprehensive comparison, and rigidly enforced them as the conditions of all trustworthy knowledge. The Socratic method was first applied by him to man, and what concerns man; but the disciples of Socrates, having learned the secret of wise observation, could not but apply it to nature forthwith; and out of this Socratic school came the ambitious cosmogony of Plato, the per-

fected logic, and the sober and in many respects solid physics of Aristotle, with the beginnings of that geometry which soon was so nearly perfected as not to be disdained by Newton and La Place,—the geometry which the modern schools that are most jealous of the study of man, rightly and earnestly insist on as the only condition of science, writing over their portals as Plato did, "*Let no one enter here who cannot geometrize.*"

As we trace the beginnings of modern physics, we find that the true method of interpreting nature was sought for by Bacon and Descartes in the nature of man, by the first impliedly and yet abundantly, by the second confessedly and formally. The present century, so distinguished for the achievements

of physics, numbers not a few among the most successful students of nature whose attention has been given to the scrutiny of the methods of science itself. We name Davy, Herschel, Whewell, Agassiz, Faraday and Tyndall, all of whom have judged the science of induction to be the most fundamental, the most wide-reaching and fascinating of sciences. Not a few, like Davy, have combined poetic and metaphysical tastes, with a genius for physics. We may say almost universally that men great in discovery and profound in philosophic research, have always been forward to recognize that man must furnish the key to the mysteries of nature, he himself being the greatest mystery of all. There have been many so-called physicists who

were content to find, or take their formulæ and principles at second hand, and work them out in problems and experiments, many who have hastily borrowed or stolen them from some crude and effete metaphysics, but never was there a philosopher of nature who looked for a theory of his science, who did not believe in a science of man.

Our position is still further confirmed by the defects in this regard of some of *the recent philosophies* which are now attracting general attention. These philosophies have these features in common: they all claim to be constructed in the spirit of the inductive method, and after the analogies of modern physics, and to be justified by actual experiment.

But they all can be shown to be seriously defective, for the reason that their science of man is too narrow or erroneous to furnish a solid basis for any science of nature whatever.

We begin with the philosophy which is now in the mouth of every man, the so-called *Positive Philosophy;* and to be both discriminating and just, we will first notice it in that form in which it was taught by its original expounder. The fundamental doctrines of Comte and the characteristics of the Positive Philosophy, are thus summed up by Mill: "We have no knowledge of anything but phenomena; (and our knowledge of phenomena is relative not absolute.) We know not the essence nor the real mode of production

of any fact, but only its relations to other facts in the way of succession, or of similitude. These relations are constant, that is, always the same in the same circumstances. The constant resemblances which link phenomena together and the constant sequences which unite them as antecedent and consequent, are termed their laws. The laws of phenomena are all we know respecting them. Their essential nature, and their ultimate causes, either efficient or final, are unknown and inscrutable to us." * Of this Positive Philosophy, as thus expounded, we observe that it is properly if not emphatically metaphysical. Against this charge Comte would earnestly

* J. S. Mill, the Positive Philosophy of Comte, pp. 7 and 8. Am. Ed.

protest in the words, "Have I not demonstrated by a broad and decisive induction that the human mind must have passed through the stages of theology and metaphysics before it could reach the apotheosis of positivism? If this induction is good, I cannot be remanded to the condition which I have already outgrown." We do not care to question whether this historic induction of Comte is correct, concerning which his own adherents hold diverse opinions, nor do we urge that he has no right, according to his fundamental principles, to make any *historic* induction at all; we simply assert the fact that the positive philosophy is a metaphysical phenomenon. To urge that it cannot be, because it does not occur in the right order of time, is to urge

that a patient cannot have scarlet fever or the measles, because the same patient, according to the theory of these diseases, can have neither a second time. It is, to apply the *à priori* method, to set aside a *positive* phenomenon or fact. That the positive philosophy is metaphysical, in the proper sense of the term, is too obvious to admit of question. Its *problem* is metaphysical. It proposes not only to discover the criteria of the processes which are common to all the special sciences, but it sets these forth as the criteria of every true science. Its *method* is metaphysical in so far as it passes each of these sciences in review, and reapplies these principles to each for its subsequent reconstruction and correction. Like every other metaphysical system, it con-

cerns itself with *relations.* But constant relations are what in all systems exalt observed phenomena to the dignity of science. Other systems recognize more relations—those of causation or force—mayhap those of design. Comte's metaphysics hold to fewer, those of sequence and similitude. To use a figure of clothing, while other systems honour, by recognition and use, the habiliments which obvious necessity and universal usage have sanctioned, this sect appear among the *sans culottes* of philosophers, on the principle that the fewer clothes we have, the nearer we come to naked truth, and the less occasion we have to look after our clothes, or the less we are tempted to think more of the clothes than of the man.

Mill, indeed, while he concedes (p. 8) that

Comte, without knowing it, accepted and sought to solve the problem of metaphysics, contends that he rightly defined and avoided metaphysics, in the technical sense of the habit of "conceiving of mental abstractions as real entities, which could exert power, and produce phenomena, etc." That this tendency to hypostasize abstractions into real agencies has prevailed in all ages, we admit; that Comte and Comte's disciples have not escaped its influence, it would be easy to show. No class of reasoners seem to exemplify it more eminently. Every question which you ask them beyond the charmed circle of the formulæ which the master magician has drawn around them by wand and charm, is answered by the stereotype phrases of sequence and sim-

ilitude, till it would seem as though these relations had become personified into the living forces on which the universe depends for its existence and ordering.

But all this is by the way: the only point which we care to urge against Comte, is that he does not recognize the presence and the agency of man; that he attempts to furnish a philosophy of science which leaves entirely out of view the prime element in science, the nature of knowledge as explained by the nature of men as qualified to know. Man is not recognized by Comte * as such a being at all, but only as a mass of nervous substance, incased in a material shell, the

* *The Positive Philosophy of Auguste Comte*, translated by Harriet Martineau, Book V, Chapter VII.

functions of which, so far as they are deemed worthy of notice, are simply physiological, with the added capacity to expand or modify the incasing skull. Even the poor compliment is not formally paid to this nervous substance of being able to respond to the relations of sequence and similitude in material phenomena. Much less is it honestly conceded, what Comte's own system requires, that this mass has the additional power to observe the relations of constant sequence and similitude between its own material condition and any one of these acts of response or observation. All this is overlooked, and superficially huddled away into the general statement that what are called psychological processes, are properly included under biological phenomena; and this by the

man who claims for the functions of his own brain, the magic power to discover the follies of all the preceding philosophies, and to prevent all error in succeeding ages! Man, as treated by Comte, is not even cavalierly bowed out from the ivory gate of this palace of magnificent pretensions, but the door is contemptuously and violently thrust in his face; and then, inasmuch as there can be no science and no philosophy of science, in which the presence of man must not somehow be implied, he is smuggled in by the meanest of the servants through the narrowest postern that was ever devised.

Much may be truly said in praise of Comte and the positive philosophy. The daring of his problem, his exact and manifold knowl-

edge of the special sciences, the breadth of his generalizations, especially in mathematics and physics, the cool severity of his stony-eyed criticism, all these deserve the highest commendation. But the naive and narrow simplicity which leaves out of sight man or the knowing agent, in a philosophy of knowledge, and the unconscious innocence of his metaphysical abnegation of metaphysics should claim no man's admiration. The student of nature, or of history, who is content with a formula to work by, may be satisfied with the positive philosophy, but any one who looks for a well-rounded theory of all human knowledge, and a comprehensive statement of the axioms and the principles which it involves, cannot but be disappointed with Comte's

teachings, and reject him as a trustworthy expounder of Philosophy.

John Stuart Mill, the follower, yet critic of Comte, has distinctly recognized some of his defects, and has attempted to supply them. But he has failed in *four* essential particulars. He has neither given a satisfactory theory of the mind, nor of matter, nor of the process, nor of the axioms of induction itself. Though he contends most stoutly for the legitimacy of psychological observation, and the necessity of a correct theory of the soul as fundamental to induction, he provides no such theory; as how could he, if he limits this science, after the dictum of his master, to phenomena and the relations of sequence and

similitude? The knowing agent that must not only build up science, but provide its foundation principles, Mill resolves into successive states of consciousness; he even calls these feelings, which are wrought by we know not what. He defines the agent that believes in the spectroscope, and is not dazed by the sun, "as a Series of Feelings with a background of possibilities of feeling."* We do not stay to inquire what the word *background* can mean, unless it be the knowing *ego* familiar to common sense and not unnecessary to philosophy, which is smuggled in through the *back-door* of a vaguely metaphorical term; nor whether *possibilities* does

* *Examination of Sir William Hamilton's Philosophy*, Chapter xii.

not involve, while it seems to hide the relation of causation or force, against which Mill protests. We only observe that it is more creditable to the candor of Mill than to his acuteness, that, on second thought, he completes this definition of the soul by calling it also "a series of feelings which is aware of itself as past and future." * Here again we have another example of this subreption by a postern, of the notions of the soul itself and its relations to time, both of which had formally been discharged by the front passage as superfluous. More amazing still is it, that after making this correction, he recovers his sense of consistency, or, rather, demonstrates his own insensibility to

* *Ibidem.*

the absurdity of his position, by confessing that "we are reduced to the alternative of believing that the mind or *ego* is something different from any series of feelings, or possibilities of them, or of accepting the paradox, that something which, *ex hypothesi*, is but a series of feelings can be aware of itself as a series."* Which of these alternatives does he embrace? Does he adhere to the one construction which his formal definitions, as well as the whole drift of his philosophy requires him to support, or does he frankly concede that he believes in a mind as an agent, an existing being, which is something more than a series of feelings? He does neither, but proceeds to affirm: "The truth is that we are

* *Ibid.*

here face to face with that final inexplicability, at which we inevitably arrive when we reach ultimate facts."* But why not accept the facts and shape one's definitions accordingly, instead of constructing a definition of the soul, and building a theory of induction upon it, which must be split upon these facts. He prefers to concede his failure in the extorted acknowledgment, "I do not profess to account for the belief in mind."† We had not expected such a confession without repentance, and, what is worse, without a sense of the need of repentance, from the modern lawgiver of scientific method; from the new Bacon, who has codified the rules for the

* *Ibid.*

†*Ibid.* 8*d Lond. edition.* P. S.

inductive study of nature; from the plausible and pertinacious antagonist of what he calls *à priori* metaphysics!

Not only has Mill entirely failed, and by his own confession, to provide a mind which can interpret matter, but he has failed as signally to provide for our belief in matter, or the universe of nature, which man is to interpret. Though he claims, by eminence, to be the philosopher of things,* though he denounces with a slight disdain those who prefer thoughts to things, he makes no provision for our knowledge of things, or our belief in the material world. His formal definition of matter (while it is vastly more vague and unsatisfactory) is as purely idealistic as that of Berkeley or Collier.

* *Logic*, B. i., C. ii.

Matter he defines as "a Permanent Possibility of Sensations." * He concedes that this definition would satisfy Berkeley, and that in any other sense than this he does not believe in matter. He did not seem at first to be aware that through the word *permanent* time has stealthily crept into his definition, and that *possibility* is not too narrow to let in causation, that dreaded metaphysical entity. He makes a fearful nod, when he says explicitly, "the possibilities are conceived as standing to the actual sensations in *the relation of a cause to its effect.*" * His assurance culminates when he refers our faith in the permanence of these possibilities to the

* *Exam. etc.* Chap. xi.

* *Exam.* Chap. xi.

assumption that sensations similar to our own are experienced from material objects by other beings. "The world of possible sensations succeeding one another, according to laws, is as much in other beings as it is in me; it has, *therefore*, an existence outside of me, it is an external world."* As if the existence of other beings, with the relations of *outside* and *inside*, were not the things to be accounted for, and as if, through the door opened to admit this item of proof, space and its relations, including matter, had not marched boldly in, after both had been formally excluded, till they could be formally introduced by a philosophical ticket of leave!

* *Ibid.*

But allowing Mr. Mill to believe in man and nature, as much or as little as he will, we inquire, with greater earnestness, what is his theory of induction, *i. e.*, how does he explain the process, and on what foundations does he rest the structure? These questions are somewhat important, when the scientist requires me to believe in the spectroscope. Especially are they important in the view of the neophyte, whose faith in science is weak, and who considers all at once the number of assumptions that enter into the result,—the truth of gravitation, the theory of light, the chemical analysis by light of burning bodies and gases, and, above all, when he takes into account the enormous distances, and the subtle indications. It is not wonderful that he asks "how

and why is it that I am justified in accepting this wonderful story, as enchanting, if it be not as fabulous, as the story of the "Lamp of Aladdin?" Pray, Mr. Mill, who knowest every word and syllable of the magic spell, repeat it to me letter by letter and word by word, confirm the steps of my tottering faith, trace out for me the subtle and narrow path, along which the philosopher has reached the stars, and even cast himself into the abyss beyond.

How does Mr. Mill answer these entreaties? "Induction, my son, in philosophical language, is the result of repeated experiences of sensations, so closely combined as to have become practically inseparable. We learn in this way to make the familiar and the near to represent the unfrequent and remote, according to cer-

tain axioms and principles, concerning the uniformities and laws of nature, and the relations of time and space, which give mathematical truths and relations." "But whence are these ultimate beliefs derived?" To this Mr. Mill has no other reply; "all these are derived from induction, even the very principles that are used in induction, and the very beliefs that are most sacred concerning the sequences and similitudes of phenomena—these all are the products of induction; even though they are the conditions of induction; and all come from inseparable associations." "Is this all that can be said of them? How then can I trust them, supposing I have not yet learned to associate these things together; or what if they should be differently connected in other minds?" To this

he would reply, "The last is supposable; and the consequence would be, that those minds would have different beliefs concerning the laws of nature, and even concerning the fixedness of any laws of nature, or the relations of number and magnitude. It is supposable that to the inhabitants of another planet, the inseparable associations should be so strangely mixed and readjusted, that they should multiply *three* and *four* into *eleven*, and should conceive, that to issue ten per cent. dividends signifies to steal the capital ten times over. Or the inhabitants of another might be trained to believe that two straight lines might so inclose a space, that a railway charter from New York to Erie might be mathematically demonstrated to cover all the adjacent territory indefinitely in every

direction." But to correct all such abuses, he would add, "you can use experiments and they will verify all correctly joined associations, and expose those which are false." But, urges the novice, I can make but few experiments, and concerning objects of limited reach; and what I am required to believe is a long way off. I cannot test the assertion that sodium is actually burning in the sun, the indications are so very remote, though very plausible. I can burn the sodium in my lamp, and as I watch the spectrum, I can refract another spectrum from the sun; but how shall I pass from what is united in the one to what is unknown in the other? Nay, how do I know that what you sometimes call causation and at other times call sequence, prevails in the sun at all? This

question is so important, and the answer so fundamental to the neophyte's faith, that Mr. Mill would probably refer him to chapter and verse in his "System of Logic," and read as follows: "In distant parts of the stellar regions, where the phenomena may be entirely unlike those with which we are acquainted, it would be folly to affirm confidently that this general law of causation prevails any more than those special ones, which we have found to hold universally on our own planet. The uniformity in the succession of events, otherwise called the law of causation, must not be received as a law of the universe, but of that portion of it only which is within the range of our means of sure observation, with a reasonable degree of exten-

sion to adjacent cases. To extend it further, is to make a supposition without evidence," etc.* "But if all this is so, I may as well give up my faith in the solar spectrum. Sodium burns in the lamp, and its flame can be defined, but to conclude that sodium burns in the sun, because the sun emits a similar light, does not seem reasonable; the cases are far enough from being adjacent, and the circumstances are, in manifold particulars, very unlike." Mill's very slender basis for inductive reasoning would seem to be as suitable to confirm the doubter concerning some new discovery in physics, as the writings of Colenso to strengthen faith in the Pentateuch, or of Strauss and Baur to lead to confidence in the Gospel

* *System of Logic* B. iii, C. xxi, Sec. 5.

History. But the defects in his philosophy of induction are necessary consequences of his defective and uncertain science of man's power to know. The signal failure of one of the most elaborate attempts that has ever been made to furnish a scientific foundation for the science of nature is explained by its defective and uncertain science of man.

The defects of Mill's philosophical writings are the more conspicuous, the more sharply they are contrasted with their manifold excellencies. His rules for the practice of induction are comprehensive and sagacious, and they are amply illustrated and applied. His observations upon classification and language are rich contributions to philosophical literature. His acuteness in criticising, and his skill

in exposing the vulnerable points of antagonistic philosophies, as also his admirable candour in confessing the difficulties of his own, with his something more than admirable unconsciousness that his confessions amount to a complete surrender of everything for which he would contend, forces his reader at times to exclaim, *miranda simplicitas si non sancta.* Like Comte, he protests that he does not discuss metaphysics, but only logic; striving to set up a distinction between the reasons of the logical rules which he professes to expound, and the underlying philosophical axioms which he styles transcendental metaphysics. And yet these he is constantly obtruding and endeavoring to account for; contending that our ideas of time and space, the conceptions

and axioms of mathematics, the belief in causation, in induction, and in the uniformity of the laws of nature, are all derived from experience; while experience, with its authority for the distant and the future, is the product of associations that have become so inseparably blended that they cannot be got rid of.

From Mill, we proceed to the *cerebralists*, to *Alexandee Bain* and his school, who limit the science of man to the analysis of the brain and its functions, and claim that the so-called physiological psychology is the only basis for a solid science of the soul. This point we shall not contest; we urge only, that if the basis is broad enough for a science of man, it is neither broad nor deep

enough to support a science of nature. Let it be granted that brain convolutions and nerve vibrations or nerve growths may account for the differences and developments of the human soul; that vision is simply a nervous response to the undulating light, and touch is an adjustment of particles in the innerved cuticle in accordance with the molecular agitations in the solid with which it comes in contact. Let it be granted that memory, imagination, classification, and reasoning, are but material forces newly correlated in the form of nervous movements, and that what is called self-consciousness is one set of brain fibres dancing a mazy antistrophe to similar fibres in a corresponding brain lobe. Granting that all of man which we call thought, emotion, and aspiration, is

reducible to the workings of mechanical statics and dynamics, we fail altogether to explain how man, so constituted and so acting, can form a science of nature; how Newton came to connect the falling stone with the moon steadily detained and impetuously struggling in its path, and ventured to write down the law of each in a brief algebraic formula; nor how Kirchhoff happened to imagine and was inspired to believe, that he could see the burning sodium in the molten crater of the sun, and could follow the hydrogen that flashes in jets along its surface. Let cerebral physiology do what it will in its movements against a better theory of man: Let it call into its aid the portentous battalions of the correlated forces; let unconscious cerebration dart in and out

of the conflict with its wily and quick-moving cavalry—one and all fail utterly to demolish the solid squares of convictions on which the intellectual soul must plant itself when it makes good a grand discovery, like those of Newton, or Davy, or Faraday, or Kirchhoff. The eloquent John Tyndall has truly said, more boldly perhaps, than he was aware, and forgetful of consistency with many of his teachings: "It is by a kind of inspiration that we rise from the wise and sedulous contemplation of facts to the principles on which they depend." "This passage from facts to principles is called induction, which, in its highest form, is inspiration." * Whatever else may be true of the brain philosophy, it can

* John Tyndall, *Fragments of Science*, p. 60.

never explain and validate induction, with the mystery of its insight into nature's secrets and the mastery of its power over nature's forces.

From Comte and Mill, and the cerebralists, we proceed to *Herbert Spencer*, who claims to be more profound and comprehensive than them all, for whom his adherents claim that, like Kant, he is the *zermalmende Philosoph*—the all-crushing of these times; of whom it is asserted, that he takes into his system all that is true in the old metaphysical and the new positive and brain philosophies, and causes everything to reappear with a profounder meaning and a more catholic application. We cannot charge

against Spencer that he neglects or dishonours the science of man. He stands foremost among modern writers in recognizing psychology as fundamental to all philosophy, whether of matter or spirit. He may be said to accept spiritual phenomena as having existence in their own right, and as claiming authority over other facts, so far as they furnish the principles for every department of philosophy. He recognizes fully the necessity that certain principles should be necessary and axiomatic. So far all is hopeful and seemingly all that a sound philosophy could desire. But we soon discover that these fair promises are sacrificed to the merciless requirements of a metaphysical hypothesis, which is as remorseless in its exactions as it is usurping in its au-

thority. The *law of evolution*, acting as a movement of differentiation and integration, is ushered upon the scene, destined, like Saturn, to devour its own children as fast as they are produced. It is itself not proved. It does not claim to be self-evident, but simply that, like Mill's induction, it is capable of being verified by every individual instance to which it can be applied. Its terms also are so broad as to be capable of a great variety of significations. Evolution, differentiation, and integration, are words of many-sided import, as Spencer's use of them satisfactorily illustrates. Evolution is now treated as though it were a living force, endowed with the energy, and invested with the wisdom of a personal creator; and again it sinks to an innocent

symbolic formula. Differentiation and integration now rise to the dignity and mystery of organizing forces, and anon they sink into the meaningless platitudes of insignificant logical generalizations. It is not surprising that with phrases so vague in their import and so plastic in their application, the mysteries of the universe are often explained by Spencer in the manner of a dexterous juggler—as plausibly to the eye and as unsatisfactorily to the mind.

But one thing, at least, Mr. Spencer has not explained, nor does he in any wise provide for; and that is the possibility of a science of nature, and simply because by his theory the principles on which such a science rests are themselves but transient waves. thrown up for

the moment by an ever-heaving and new-evolving sea. According to Spencer, man as a differentiated and integrated type of being, is physiologically evolved from a less complex type of being. Intelligence is a more complex evolution of life, and life is the joint product of interior and exterior relations. Even the axioms of intelligence, which Spencer had recognized as the necessary and ultimate laws of thinking; these obey the same law. At first they are sprouting tendencies towards scientific axioms, which are gradually fixed and hardened in the brain, so as to strengthen with the growth, and be transmitted with the progress of successive generations. The conceptions of time and space, and the relations they involve, follow this rule, being perfected and adjusted by a

long course of physiological evolutions. This is man according to Spencer. Is he competent to attain to a science of nature? Behold him on some bright morning of the evolving æons just ushered into being—"like the herald Mercury, new-lighted on some heaven-kissing hill," which he spurns with his impatient foot, as just about to leave the earth for some higher sphere. He looks out upon nature, that he may interpret its laws, he geometrizes among the stars like a God, he weighs the mountains in balances, he takes up the isles as a very little thing, he reads the history of the earth turning back its rocky laminæ one by one and interpreting the characters that speak from each. He catches the light, and unfolds it into spectra of beauty, finding in each

one of its glowing bars some secret of nature's hidden magic. He studies the composition of matter, its crystalline orderings of method and symmetry, and its chemical affinities and transmutations. He attempts the more difficult problem of life; he pauses in astonishment before the profounder mystery of the soul. Next he essays to account for the origin of these varied forms of being, and by one daring sweep of generalization, he thinks to comprehend and explain the universe. By the magic of a formula, as vague as it is broad, he thinks he discovers that matter and spirit, that thoughts and things, are evolved by a self-moving tendency, after which life is lifted out from death, and intelligence springs forth from life. He asserts that the science of the

universe is unravelled by a newly-corrected science of man, adjusted to his metaphysical theory. But is it so? Has Spencer succeeded? Let it be granted that so long as man endures as a persistent type of knowing force, with his interior relations—*i. e.*, his powers, his categories, his time and space—that so long the science of the universe, which is built up by the application of them all, may stand and be trusted as true. But what is to happen at the next evolution of this ascending spiral staircase, when another form of knowing energy is evolved with its new and more complex furnishings? May not some new interior relations emerge—some powers and modes of thinking, some principles of science itself, which shall reverse the science of to-day, and cause

the principles of Newton, the logic of Mill, and the first principles of Spencer himself, to be but an empty babble, because they are all outgrown; the intellect newly evolved finding in them no import, and acknowledging in them no authority?

To this it will be replied, that Mr. Spencer assumes that there can be no new evolution of the power to know, which does not correspond to some new objective relation in that which is known; that while it is true that the beliefs in time and space are themselves developed, he assumes that there correspond to them certain exterior relations; that in fact, he even goes further and surrounds this finite universe with the incomprehensible somewhat, whom he allows us to believe, provided we will concede

that what we believe does not correspond to the truth; and summons us to worship, provided we will confess that we worship we know not what. He does indeed assume all this. But by what authority does he enforce these dogmas? except by the impressions of a being who is himself evolved, and whose power to believe that there are realities which answer to his own interior relations, is itself a transient interior relation which has been evolved from the agencies that have chanced to produce it, and whose methods of knowing are themselves the products of an evolving and changing physiological growth. If the man of the present æon, as the philosophy of Spencer explains, is warranted in trusting the axioms of evolution and the persistence of force, then these

axioms are something higher and more authoritative than physiological products, evolved by the coincidence of exterior and interior relations. If Mr. Spencer's First Principles, or the first principles of any other philosopher, are to be received as the foundations of science, they are good for all time, for all the past and all the future. They have a higher and more permanent authority than his special theory can vouch for. The sciences of nature and spirit which he expounds cannot stand upon any foundations which he provides for their support in his science of man. Every such science is weak just in proportion to the sweep of its pretensions and the accumulation of its facts. It is like an imposing engine that is reared upon a pedestal that is massive to the eye, but

which crushes its foundations into sand by the first movements of its ponderous and complicated structure.

The position which Spencer holds among the philosophers of our time is so unique as to justify, if not to require, special attention. Many-sided in his culture, especially on the side of physics, mathematics and natural history, and apparently familiar with the history of human culture and human progress, he seems to command an inexhaustible fund of pertinent and attractive illustrations. If he is not always clear in announcing his principles, if his arguments do not always convince us of the truth of what we do understand, the wealth and variety of his facts never fail to delight and astonish the confiding reader who cannot find it

in his heart to distrust so well furnished a writer. The apparent breadth and daring of his generalizations surprise the student who does not consider that philosophical genius is as strikingly displayed in the acute detection of subtle differences as in the vague suggestion of broad and meaningless similarities. The catholic spirit with which he seems to desire to do justice to every system of philosophy and religion, prepares for an easy credence of the universal solvent which promises to decompose them all. The positiveness of his manner and the dogmatism of his assertions, which increase with the paradoxical character of his opinions, are elements of power with readers whose credulity rises with the daring of their admired and trusted leader. It would not be fair to

say that, so far as matter is concerned, Spencer writes like a sophist or a charlatan, for the reason that he instructs in too many single and important truths. But it is not unjust to assert that in method and manner, he is master of the art of imposing exposition. The reader who has had some experience in the necessary art of searching for a meaning and method in writers, in which neither is obvious, will often lay down Spencer in despair, if not with disgust, for his stealthy subreptions, his cool word-plays, his confounding of inductions with axioms, and his sacrifice of common sense to the requirements of an unproved theory. The clearness of his diction is no compensation for the lack of that earnestness and *verve* which are the never-failing indications of the highest

qualities of genius. The coolness of his manner rather betrays than hides the consciousness of paradox. His attempt to reconcile philosophy with religion proves his conceptions of both to be superficial. No well-read student of philosophy can hesitate to believe that, notwithstanding the zeal of his admirers, he will cease to be the wonder of the hour: that so soon as the secret of his plausibility is exposed he will suffer a more complete neglect than he will fairly deserve.*

*The author takes the liberty to call the attention of his reader to the fact that this is a metaphysical essay or meditation, the argument of which is directed to a single conclusion, and is in no sense a comprehensive treatise or criticism of any system of philosophy. While he claims no exemption from the obligation to interpret Spencer's doctrines correctly, and to state them honestly, he does not consider himself required to expound his system at length, or to show that in many of the positions to which he attaches very great importance, and urges with the greatest persistence, he is flagrantly inconsistent

These arguments and criticisms must suffice. We do not urge that a profound study of man, with himself; that he not only goes beyond the range of knowledge and belief to which he had limited himself by his theory of evolution, but introduces assumptions for which his system makes no provision. With the most earnest desire to understand Spencer, and some effort to reconcile his doctrines with one another in logical and philosophical coherence, we can find no place in his theory for what he calls *Ultimate Religious Ideas*, for the reality of which he contends so earnestly as against Hamilton and Mansel, with naïve unconsciousness of any inconsistency with his own theory of knowledge; on which theory, however, he does not hesitate to fall back at once as soon as he seeks to demonstrate their perpetual *unknowableness* by man. Nor is it any easier to see how this theory allows him to distinguish between a *formulated and unformulated consciousness*, after having shut himself up to that consciousness which is formulated; nor how his explanation of *the genesis* of the ideas of *space and time* by evolution, can provide at all for his belief of the necessity or universality of these ideas, or of the realities which correspond to them; nor how the philosopher who has limited the researches of science to the relations of coexistence and sequence, and has thereby formally excluded the relation of causation, should abruptly introduce us to something which he denominates *force*, which he oracularly informs us is inscrutable, and concludes therefrom that matter and spirit may therefore be mutually convertible and interchangeable. The reader who chooses to make the experiment for himself, of explaining and

or a formal recognition of the principles which underlie the study of nature, are essential to eminent attainments in special sciences, or to enlarged and liberal views of scientific research. The working formulæ of a single science, and, indeed, of many, may be mastered by an adept, and skilfully applied to brilliant achievments, almost without the suspicion that they can be justified by a philosophic method. The principles and methods of induction are practically taught by nature and common sense to every one who is willing to use them. But should any one be questioned or denied, either in obedience to the private maxims of a special

reconciling these incoherences of Spencer, is referred to his *First Principles*, Part I., Chapters ii., iii., and iv. Part II., Chapter v., and *The Principles of Psychology*, Part IV., Chapter vii., § 208.

philosophy, or the spirit of a narrow and special study of a part of nature called physics, they must be recognized and defended, and in order that they may be defended and recognized, they must be carefully studied by a thorough examination of man.

For this study, the devotee of any special science may be the more disqualified in proportion to his zeal and success in his own department. But for this very reason, the greater may be his confidence in pronouncing upon questions of this sort, and with a positiveness which is proportioned to his incompetence. Nothing is more arrogant, and nothing ought to be more offensive, than that the powers and principles on which all science and induction depend, should be resolved by or after analo-

gies derived from the mechanics of matter and the dynamics of life. To narrowness of this sort the sciences of nature offer special temptations. The objects are so real, the processes are so definite, the experiments are so satisfying, the enthusiasm is so contagious, that the devotee is tempted occasionally to forget that he is a man as well as a scientist, and to adjust his estimates of human science and culture, and even of man's power to know, by a standard taken from a single and a narrow sphere. He that would converse with Nature with effect, in these times, must retire apart into a separate cave that is lonely and far withdrawn. Within its recesses alone does Nature whisper her choicest secrets, and after a long and painful initiation of the devotee. To his uplifted

torch alone does she reveal the starry roof and the brilliant vision. No wonder that when he emerges into the light of common day he is as one dazed and bewildered, and talks of common things with strange and perverted speech. A one-sided cultivation, with its positiveness and not ill-grounded conceit, is not barbarism indeed; but it is not culture, in the large and generous sense of the term. A system of education, which is bent upon training specialists in any department, may be defective in proportion to the completeness with which it absorbs and limits the energies of its devotees. That the study of man is fitted to correct these exclusive tendencies has been demonstrated by the many eminent examples which modern

physics has furnished of philosophers distinguished alike for imaginative genius, careful observation and speculative interest concerning the nature of man and the methods of science. That these tendencies need to be corrected is as strikingly proved by the number of scientists of another sort, who are not content with a well-earned reputation within their own departments, but set themselves to reform psychology and metaphysics after the law of the dissecting room, and to correct theology in very extemporized *Lay Sermons*.*

*The writer has no desire to say hard things of Mr. Huxley, because he has chosen to adopt the title of Lay Sermons for certain of his discourses. But he cannot avoid the impression that he would have done much more wisely had he pursued a course with respect to metaphysics and theology, similar to that which he does not hesitate to recommend to clergymen and metaphysicians with respect to science, i. *e.*, had he let them alone. The confident utterances in

We do not overlook the truth, that the student of man is exposed to a narrowness and dogmatism of his own, and can learn much, if he will, from the sciences of nature. All these sciences are but the products of the varied applications of his spiritual power to the investigation of that truth which must be tested by experiment, and enforced as fact. A mistake in the investigation of nature is not only certain to issue in failure in discovery, but it at once attracts attention to the error of method in the experiment or of principle in the theory. Nature is fearfully and sternly realistic. She

respect to the fundamental problem, of philosophy and the truths and duties of religion, which are freely expressed in many of these discourses, appear to the greatest disadvantage when contrasted with the purely scientific expositions into which they are interwoven. They seem to have many of the worst characteristics of the most offensive descriptions of sensational preaching.

abhors the brilliant vagaries, the imaginative rhapsodies, the cloudy phraseology and dreaming idealism in which the one-sided student of man and of metaphysics is tempted to indulge. While she suggests an elevating and spiritual philosophy of her own, and hides a magnificent history in her past, as well as veils a more splendid romance in the future, she deals very summarily with the metaphysical cosmologies, the idealistic physics, and realistic logics which imaginative students have put forth as *à priori* philosophies of nature. The student of the mind and of man, who has been schooled by a close and stern wrestling with the forces and laws of matter, cannot but carry the lessons which he has learned into the study of the soul and of the methods of

science. He will exact from others and impose on himself severe requirements in respect of clear definition, rigorous logic, well-grounded analogies and coherent arrangement. The best security against the recurrence of that metaphysical romancing by which the science of man and the logic of science have been dishonored in the past is to be found in the methods to which physics are so vigorously held. Under the pressure of these lessons the metaphysics of the future are likely to prove sober and discreet. If they should need any additional warning from this quarter, they can find them in the examples of extravagant metaphysics which are furnished by the physicists and physiologists who would develop man and the inductive philosophy itself from

the crucible, a bean-stalk, or the gorilla; or the metaphysicians, who answer all possible question concerning the universe, by a formula of sequences and similitudes, and a law of evolution forever proceeding from some *worshipful unknowable.*

The study of man is not necessarily the study of psychology or speculative philosophy. Man is made manifest in history, philology, literature, art, politics, ethics and theology. The thoughts of man have recognized and accepted those principles and institutions, those manners and laws, that civilization and culture which give security and grace to the present life, which awaken the anticipations and confirm the faiths which reach into another. The study of all these is a study of *the humanities.*

It enables us to understand man, and to benefit man not only as he interprets and controls what we call nature, but as he interprets and controls that which is highest in nature, *i. e.*, man himself.

This suggests the thought that the science of nature is not only related to the science of man because man interprets nature, but because man is a part of nature, and nature cannot be truly and liberally interpreted unless man, in his higher capacities, is embraced within her plan and made the end of her agencies. That is a very narrow view of nature which only finds in nature physical agencies, and limits her resources to mechanics and chemistry, but discovers no place in her broad expanses or her generous provinces, for spirit

or intelligence; accepting no man but protoplasm. That is also a narrow view which recognizes man's higher endowments and destiny, but allows them a scanty place and meaning in the scientific interpretation of the physical arrangements of the universe. The science of man and of man's higher nature in its highest developments, is essential to a science of nature, because nature itself cannot be interpreted except as designed for the uses and culture and development of man as a spiritual being. Thus to interpret nature does indeed require that we assume design in nature. But all philosophy must assume this, so far as it interprets the past or forecasts the future. The positive philosophy does this when it assumes that "the relations of

sequence and similitude" are constant, that is, are always the same in the same circumstances. Darwin and Spencer both assume that there is a plan of successive development or evolution provided for in the infinite capacities of the undeveloped germs, if such began at all, or in their still more enlarged capabilities of successive evolution and disintegration, if the march of evolution is in cycles returning upon one another. It would seem that the wise intelligence assumed for this law of evolution would draw so heavily upon the faith of its defenders, as to leave them little courage to sneer at the theory of creation, as "the carpenter theory." But upon questions of consistency or taste, we have no room to enlarge. We contend at present only for the

position that we cannot have a science of nature which does not regard the spirit of man as a part of nature.

But is this all? Do man and nature exhaust the possibilities of being? We cannot answer this question here. But we find suggestions from the spectrum and the spectroscope which may be worth our heeding. The materials with which we have to do in their most brilliant scientific theories seem at first to overwhelm us with their vastness and complexity. The bulks are so enormous, the forces are so mighty, the laws are so wide-sweeping and at times so pitiless, the distances are so over-mastering, even the uses and beauties are so bewildering, that we bow in mute and almost abject subjection to the

incomprehensible all, of which we hesitate to affirm aught, except what has been manifest to our observant senses and connected by our inseparable associations. We forget what our overmastering thought has done in subjecting this universe to its interpretations. Its vast distances have been annihilated, for we have connected the distant with the near by the one pervading force which Newton divined. We have analyzed the flame that burns in our lamp and the flame that burns in the sun by the same instrument—connecting by a common affinity, at the same instant and under the same eye, two agents, the farthest removed in place and the most subtle in essence. As we have overcome distances, so we have conquered time, reading the story of antecedent

cycles with a confidence equal to that with which we forecast the future ages. The philosopher who penetrates the distant portions of the universe by the *omnipresence* of his scientific generalizations, who reads the secret of the sun by the glance of his penetrating eye, has little occasion to deny that all its forces may be mastered by a single all-knowing and *omnipresent* Spirit, and that its secrets can be read by one all-seeing Eye. The scientist who evolves the past in his confident thought, under a few grand titles of generalized forces and relations, and who develops and almost gives law to the future by his faith in the persistence of force has little reason to question the existence of an intellect capable of deeper insight and larger foresight than his own,

which can grasp all the past and the future by an all-comprehending intelligence, and can control its wants by a personal energy that is softened to personal tenderness and love.

We blame not the scientific discover when, fresh from some triumphant experiment he rejoices in the consciousness of power. We wonder not that he rises from his feat of discovery with a sense of mastery and dominion. Man, by thought, *is* THE KING of the universe, so far as by thought he masters its secrets and lays his hand upon its forces. Let him be crowned as King by science, and let no one dispute his right to rule. But let him never forget that it is only by the right which spirit asserts over matter — which thought assumes over things—that he has

gained this dominion, and that he can extend it only as he learns more wisely how to know and use his own sagacious self-relying mind.

But has nature no other king? To answer this question fully lies not within our scope. The suggestions which we have made, would seem to establish the conclusion that the sciences of nature, when viewed in their fundamental philosophy, do not necessarily lead to Atheism. The history of these sciences of nature moreover testifies that while the dexterous workers in experiments may successfully apply the formulæ which the thinkers have furnished, and be content to look no further; the architects and philosophers of nature have uniformly discovered the foundations of a philosophy of nature in the spirit of man,

as capable of thinking the thoughts of God. The nature of science, as justified by the mind of man, also reveals the truth that its methods and assumptions are but varied acknowledgments of an originating intelligence, whose thoughts and purposes we interpret just so far as we discover the forces, determine the laws, or explain the history of the universe.

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